

NOTES

ON

SNAKE BITE,

WHAT TO DO,

Including the Use of Strychnia,

(DR. MUELLER'S ANTIDOTE).

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WHAT TO DO IN CASES OF SNAKE BITE.

As quickly as possible after being bitten—

TIE A CORD
TIGHTLY

1. Tie something very tightly just above the bite.

A boot lace or a strip torn from the clothing.

2. Tie another cord very tightly higher up.

The cord can be made tight by winding it several times around the limb, or if only once round, by passing a stick under it and twisting it around until the cord is tight enough to stop all circulation.

This prevents any poison that may be in the wound from getting into the system.

When the bite is on the face or body where a cord cannot be tied, cut the piece out at once.

3. Examine the part bitten *after* the cords are tied.

Never stop to do this before the cords are tight.

TWIST WITH A
STICK

CUT OUT A PIECE

4. Pinch up a piece where the punctures are and cut it out with the middle of the blade of a knife or with scissors, as deep as the fangs have entered.

The cut must be deep enough to remove all the poison or to expose it so that it can be washed away.

QUARTER-INCH
DEEP

The longest fangs are less than quarter-inch so that cutting out a piece to this depth must remove all poison remaining in the wound.

Cutting the piece out is more effectual, less dangerous, and is not more painful than simply cutting into the part.

WASH WOUND

5. Wash the wound with warm water, or in a stream.

The washing also removes any poison remaining; sucking the wound also removes a part of the poison; but if there be any crack or sore in the mouth there is danger to the person sucking; it is therefore not advised, except where no help is near, and can be done by the person bitten.

DANGER OF
SUCKING

APPLICATIONS TO
WOUND NOT OF
MUCH USE

When properly cut out and washed, no further application to the wound is needed; but if there is any reason to think that any poison still remains in the part, it may be burnt with a red hot fire stick, or any acid that is at hand.

PERMANGANATE OF POTASH

AVOID PANIC
KEEP QUIET

DO NOT GIVE
SPIRITS,
THEY DO HARM

PERIL OFTEN
GREATER AFTER
SPIRITS

AMMONIA NOT TO
BE GIVEN

Permanganate of Potash, when in direct contact with the poison, destroys it, and renders it inert; but before this can be placed where the poison is, some of the poison has entered the system, and then nothing is yet known to counteract its effects except strychnia.

6. Do not get in a flurry or panic.
7. Keep the person quiet, and do not allow a lot of people around.
8. Do not give any spirits.

Those doctors who have had most experience are agreed that spirits do more harm than good; especially when given in large quantities, as is generally done.

Spirit hides the signs of Snake Poison, and so misleads. Spirit never acts as an antidote, and often itself acts as a poison.

Ammonia like Alcohol is of no benefit, and may be injurious; Alcohol and Ammonia only stimulate the heart for a time, and are useless if sufficient Snake Poison is in the system; they may stave off the result for a little, but they only do so at the expense of the person's strength.

Alcohol paralyses the nerve centres in the same way as Snake Poison.

AVOID FORCED
EXERCISE

9. Do not force the person to walk about too much.

Forced exercise exhausts the strength, increases the drowsiness and lessens the chance of recovery; walking about may *delay* sleep and coma but can never prevent it where the dose of poison has been sufficiently large. Gentle exercise is not injurious at certain stages and may be useful while the only known antidote (Strychnia) is got ready.

USE OF GENTLE
EXERCISE

WARMTH

10. Keep the hands and feet and surface of the body comfortably warm.

ALLOW REST BUT
NOT SLEEP

11. Let the person rest but do not allow sleep.

FLUID NOURISH-
MENT

12. Allow water, milk, tea or coffee to be taken freely.

ALLAY FEAR

13. Try in every way to allay fear and to inspire courage and hope.

Remember that many snakes are not poisonous and that many poisonous snakes are not dangerous to a grown person.

DANGER OF FEAR

Remember that *fear alone* may cause alarming signs and may even cause death, so that it is *very important* to cheer the person up.

WATCH FOR SIGNS 14. Watch very closely for any signs of snake poison.
OF SNAKE POISON

Inability to walk properly, or to stand or sit upright.
Drowsiness, slight at first, but increasing, and sometimes ending in coma.
Faintness, skin very pale, cold, and blue.
Pulse weak, soft, and rapid.
Breathing rapid and shallow.
Pain about the heart.
Pupils increased in size.
The white membrane covering the eyes paler than natural.
Swallowing difficult, vomiting, looseness of bowels.
Intoxication even when no spirit has been given.
Delirium and partial or total insensibility.
The signs come on so rapidly that it is often difficult to notice the order.

SIMILAR SIGNS 15. Remember that nearly all these signs may arise
FROM FEAR from imagination or fright without the person
having been bitten by a poisonous snake or even
by any snake.

OR IMPROPER
REMEDIES.

Many of the signs may also arise from *improper remedies*, such as spirit—which should never be given,—or excessive forced exercise, which should never be allowed.

WHEN IN DOUBT
ACT AS IF DUE TO
SNAKE POISON

VALUE OF
STRYCHNIA

WHEN TO BEGIN
STRYCHNIA

THE DOSE TO GIVE

UNDER 10,
ONE TABLET

OVER 10,
TWO TABLETS

16. When in doubt, it is safer to act as if the signs are due to snake poison than to delay treatment until the poison has got the best of the battle.

If care be taken in the use of the remedies, and the person be closely watched, the treatment proper for snake poison will not be injurious in cases arising from fear alone.

If due to fear, one dose of strychnia will brace up the nervous system and the signs will disappear. If the signs continue then some snake poison is present, and the strychnia should be repeated.

17. As soon as the person gets drowsy or weak on the legs, give one dose of the Strychnia and continue to watch closely.

18. The dose required depends on the *severity* of the case as well as on the *age* of the person.

In a child under 10, begin with one-fiftieth of a grain (one tablet)

In a person over 10, begin with one-twenty-fifth of a grain (two tablets).

IN SEVERE CASES
DOUBLE OR TREBLE
THESE DOSES

HOW TO GIVE IT

DISSOLVE THE
TABLETS REQUIRED

FILL SYRINGE

FIX ON NEEDLE

PUSH IN
HALF-INCH DEEP

WHERE TO INJECT

WHEN TO GIVE
ANOTHER DOSE

If the signs indicate a large dose of Snake Poison begin with two or three times the above-named doses, that is, two or three tablets for a child, and four or five or even six tablets for an adult.

19. Put the required number of tablets in the small saucer, fill the syringe with clean water (working the piston up and down to be sure that it is in working order), push out part of the water on to the tablet, stir it up with the end of the syringe, and when dissolved draw it up into the syringe; next remove the wire from one of the needles and fix the needle firmly on to the syringe.

Hold the syringe lightly in the hand with the needle between the thumb and finger; thrust the needle half-an-inch deep into any fleshy part *above the part tied*.

The outer side of the calf, outer side of thigh, fleshy part of the seat, or the outer side of the arm.

Move the point about a little, then squirt in the liquid and withdraw the needle slowly.

20. If the signs of Snake Poison do not pass off in 15 or 20 minutes give a second dose and repeat as needed.

The quantity to be given as well as the frequency must depend on the effects produced.

WHEN TO
DECREASE

21. If the person improves give smaller doses and wait a little longer between.

WHEN TO
INCREASE

22. If there be no improvement do not delay to give larger doses and repeat more often until some decided effect is produced.

USE IT BOLDLY IN
HOPELESS CASES

If the case appears hopeless do not hesitate to use the Strychnia boldly—it is the only hope.

WHEN TO STOP

23. If twitchings of the muscles, pain at the back of the neck, or stiffness of the jaws is noticed, this shows that the Strychnia is acting on the system and it must be discontinued until these effects pass off.

SIGNS OF
IMPROVEMENT

24. The earliest signs of improvement are wakefulness, ability to answer, ability to walk alone, improvement in colour, pulse and breathing.

WALK IN OPEN AIR

25. As soon as possible encourage the person to walk a little in the open air but do not allow the person to become cold or to get tired out.

- GIVE NOURISHMENT.
- WHEN TO REMOVE LIGATURES
- WHEN OUT OF DANGER
- WHEN ALLOWED TO SLEEP
- HOW TO ACT IF SIGNS RE-APPEAR
26. Nourishment in a liquid form such as milk alone or mixed with hot tea or coffee should be given.
 27. The cords or ligatures may be removed as soon as it is known that the snake is not a venomous one or as soon as the signs of Snake Poison diminish, after the part has been cut out and washed, and one dose of Strychnia given.
Until they are removed the Strychnia should be injected above the ligatures, because if injected below it will be prevented from getting into the system.
 28. The person may be considered out of danger as soon as the signs of snake poison do not return.
 29. The person may be allowed to sleep if no signs of poison return in a few hours, but must be closely watched and occasionally aroused.
 30. If any signs of Snake Poison reappear the person must be roused and another dose of Strychnia given, and it must be repeated until the signs again disappear or until twitchings of the muscles occur.

GREATER CARE
NEEDED WHEN-
EVER SPIRIT HAS
BEEN GIVEN

31. Whenever any spirit or ammonia has been given much greater care and watchfulness is necessary, because spirit disguises the snake poison without preventing its poisonous effects, and so after the person has been allowed to return home or to go to sleep the snake poison may again begin to act, and if it is not noticed and properly treated the person may die.

A case is reported where this occurred.

HOW TO DEAL
WITH DEPRESSION,
NOT WITH SPIRITS,
BUT ANOTHER DOSE
OF STRYCHNIA

32. Depression or despondency must be recognised as due to the continued action of the snake poison, and no attempt must ever be made to remove it by the use of spirits. If spirits are given the depression will disappear for a time and the snake poison which causes it may easily be overlooked, and the proper treatment by strychnia be neglected.

WHEN A LITTLE
SPIRIT MAY BE
OF USE

33. *After* the person has improved by the use of strychnia, a little wine or spirit and water may be given. If it produces any exhilaration that

is a sign that the snake posion has been counter-acted. If the spirit has no effect that is a sign that snake poison is still acting, and the spirit should not then be repeated, because it will only hide the signs of snake poison, and so lead to a neglect of the only proper treatment—the continuation of the strychnia.

DEATH DUE
TO ALCOHOL
IN EXCESS

34. In cases where spirit has been wrongly given in the early stages of Snake Poison (and has not produced any excitement), as soon as the Strychnia counteracts the Snake Poison, then the Alcohol begins to produce excitement, and if it has been given in large quantity may even cause death.

HOW TO TELL
SNAKE POISONING
FROM ALCOHOL
POISONING.

35. As Spirit or Alcohol is so often given in poisonous quantities after Snake Bite, or supposed Snake Bite, and as Alcohol may give rise to signs resembling in some respect those of Snake Poison, it is necessary to point out how to distinguish between Alcoholic Poisoning and Snake Poisoning.

IN SNAKE POISON.

(a) The *pupils are dilated* and do not contract when exposed to a bright light.

(b) The white membrane covering the Eye is *always pale*.

(c) The *Pulse is Quick*.

(d) The *Breathing is Quick* and Shallow and *Quiet*.

IN ALCOHOL POISON.

The *pupils are generally contracted*; they may in some cases be dilated; but *they always contract a little* when exposed to a bright light.

The white membrane covering the Eye is *always Red* and congested.

The *Pulse is Slow*.

The *Breathing is Slow*, and irregular and *Noisy*.

THE NUMBER OF 36. It is well to know that the number of punctures seen are not a trustworthy guide as to the poisonous nature of the snake.

A poisonous snake has only two poison fangs, but it may bite in such a manner as to strike with one fang only, or it may get hold of a part, such as a finger, in such a manner as to make marks, with its palate teeth in addition to one or both of its poison fangs or with

two teeth of its lower jaw also, and so it may leave one or two or even more punctures.

At certain times also the poison fangs are shed and replaced by two new ones, which appear just behind them. These new ones may pierce the gum a little while before the old ones are shed, and if the snake bites at this time it may make two or three or four punctures.

STRENGTH OF TABLETS

37. The tablets supplied in this case contain each one-fiftieth part of a grain of Strychnia which is the smallest dose required.

HOW TO INCREASE DOSE

The dose is increased to one-twenty-fifth by using 2 tablets; to nearly one-sixteenth by using 3; to nearly one-twelfth by using 4 (this is the dose Dr. Mueller commences with); to one-tenth by using 5 and this is the largest dose usually needed, but in very desperate cases one-fifth even may be required and this can easily be managed by giving another one-tenth directly after the first.

TRY SYRINGE

38. The syringe when not in use should not be allowed to get dry inside; it should be tried occasionally to see that it is in working order.

KEEP NEEDLES
CLEAN AND DRY

HOW TO CLEAR
NEEDLES WHEN
BLOCKED

39. The needles should be carefully cleansed after use by dipping the metal part in boiling water, dried and oiled and the wire put in.

If a needle gets blocked and cannot be cleared with the wire try the fine steel rimmer which is in the case or dip the needle in kerosene and pass it through the flame; this, however, destroys the temper of the steel and makes it more liable to rust.

If not in good order the syringe and needles should be renewed so as to be ready for use in time of need.

Syringes and tablets can be obtained from any chemist or direct from DR. RENDLE.

ERRORS.

On page 16, line 17, and page 17, lines 1, 10, 16, and 17, *Strychina* should be *Strychnia*.

On page 20, line 6, after Curator the word *of* should be inserted.

On page 25, line 12, *nostrilf* should be *nostril*.

On page 27, line 15, *froxt* should be *front*.

On page 30, lines 12 and 13, *The palate is furnished with teeth as well as the jaw* should be *The palate bone in some snakes is furnished with teeth as well as the outer jaw bone*.

On page 32, line 17, *pre-maxillary* should be *maxillary*.

In all the references to Kreft's Book, the page noted refers to the descriptive letterpress. The plates are separate at the end of his book.

Further information can be obtained from—Owen on "The Anatomy of the Vertebrates"; Huxley on "Anatomy of Vertebrates"; Packard on "Zoology"; De Vis, "Transactions of Royal Society of Queensland."

Specimens to show the arrangement of the teeth, and the bones to which they are attached, are wanted in our museum and the Curator will be glad if anyone will send any large-sized heads from which preparations can be made.

SECTION II.

Snake Poison is so rapid in its effects that any remedy to be of use must be available without delay. In many cases death may occur before the arrival of a medical man, and even he would not be able to help much without having the remedy at hand. Much can be done by any intelligent person to prevent some of the poison passing from the wound into the system, and this alone may save a life.

When however the poison has passed into the system in sufficient quantity to produce serious signs, some antidote must be given without delay.

The only antidote at present known is Strychnia. For this discovery we are indebted to Dr. Augustus Mueller, of Yackandandah, in Victoria, who has not only explained its action, but has perseveringly advocated its use in face of considerable discouragement, which, as is too often the case, has been shown by a certain class of men in his own profession. His first case occurred in 1880,

and his second in February, 1887, which was then reported to the Medical Society of Victoria, and an essay read in May, 1888, before the same society. Since November, 1888, a series of papers have been published in *The Australian Medical Gazette*.

To these papers by Dr. Mueller, which have been ably supported by the Editor, Dr. Creed, and to the various reports of cases in the same journal, we owe most, if not all, of our knowledge on the subject, and I desire here to express the great obligation I am under to Dr. Mueller, to Dr. Creed, and the various gentlemen who have published reports of cases, for the information which has enabled me to arrange the foregoing directions as a guide for those in need of them.

Any unprejudiced person reading up the subject can have no doubt that many lives have already been saved, and that as the use of the remedy becomes better known and understood, no case of snake poison need be lost, provided this remedy be at hand, to be used by any intelligent person before the case becomes hopeless. Making all allowance for cases of snake bite that would have recovered without strychnia or any other remedy, I have no doubt in my mind, after a very careful study of the subject, that many cases would have died but for the

prompt use of strychnina, and that some cases did die owing to a too timid or too late use of it.

Dr. Mueller has given us a most valuable, if not an unfailing remedy, and has placed the treatment of Snake Bite on a scientific basis.

Before the publication of his ideas, even medical men were nearly as helpless as the general public in cases of snake poison, and, like the panic-stricken friends, too often fell back upon that pernicious and general resource, the brandy bottle.

A firm conviction of the value of Strychnina, in snake poison, has induced me to arrange what is now known on the subject, so that it may be available for general use.

A case that can be carried in the pocket has been fitted with every requirement, and full directions what to do, when to do it, and how to do it, also what not to do. It contains Ligatures to tie above the bite, Scissors to cut out the piece, Strychnina in accurate doses, and a Syringe to inject it with. The Strychnina is in the form of small tablets which are preferred to a solution because they are portable; they keep any length of time in any climate, they are not liable to loss

from leakage and they give an accurate dose, and so lessen the chance of any error.

The solutions now in use differ in strength to a dangerous degree. Dr. Mueller's and also that known as Huggett's, which is the only one that keeps well, contain 1 grain in 240 minims, while the standard solution of the British Pharmacopœia contains 1 grain in 108 minims. The solutions in Martindale's formulæ contain 1 grain in 50 minims and 1 grain in 40 minims. Roberts Bartholow advises 1 grain in 480 minims. The danger, therefore, of using a solution without knowing the exact quantity of strychnia is very great. If Mueller's solution is used, and the bottle (on which the strength is not stated) be sent to a chemist to be refilled, the strength may be increased to more than double if the standard solutions of the Pharmacopœia be given, to five or six times if Martindale's formulæ be followed. If Bartholow's form be followed the strength would be reduced to one-half. Nearly all solutions are very liable to alterations in strength after preparation. The disadvantages and risk of using solutions is, therefore, very great—one of them being twelve times as strong as another. No such risks attend the use of the tablets, as the quantity of strychnia in each is always stated.

The publication of these directions will, it is hoped, not only help to prevent some deaths from snake poison, but will also prevent many persons from being injured by certain dangerous methods of treatment which are, unfortunately, only too common. I allude particularly to the excessive use of spirits and forced exercise, both of which are as dangerous as they are general in adoption.

When an ignorant person does not know what to do he or she generally flies to the brandy bottle and generally does more harm than good. This evil, unfortunately, is not confined to the treatment of snake bite but is followed in nearly every emergency.

These directions being intended as a guide for general use the aim has been to express everything as plainly as possible and to avoid the use of technical terms.

The writer is conscious of many defects and will thankfully receive and acknowledge any criticism or suggestions.

It will be a great help towards a more accurate knowledge of the subject if everyone who has an opportunity will forward specimens, together with any facts or ideas on the subject. These will all be duly acknowledged and the specimens sent to the Queensland Museum.

In order to facilitate the collection of information on an uniform plan, a printed form is enclosed in the case and extra copies will be forwarded to anyone applying to the writer.

SECTION III.

The following information about Queensland Snakes has been compiled from notes very kindly furnished by Mr. De Vis, Curator the Queensland Museum, and a few extracts from Kreft's work on "The Snakes of Australia," published in Sydney in 1869, now out of print, and almost unobtainable. I have also made use of an article on Australian Zoology, by G. M., in the New South Wales *Educational Gazette*, December, 1891.

The Poisonous Snakes of Queensland, though numerous in kind (about 28), include only a few species, five or six in number, which we know from experience to be dangerous. These are:—

THE DEATH ADDER (*Acanthophis antarctica*).

Kreft, page 80, and plates x and xi., fig. 7.

The name Death Adder is also commonly given to a four-legged lizard which is harmless.

The name is also often wrongly written "Deaf Adder."

The length may be as much as 32 inches, and the girth 9 inches.

The colour is generally an uniform grey, but sometimes reddish and always mottled with darker rings; some of the scales have a black or pink spot.

The tail is short and compressed; the last scale being curved is often mistaken for a sting.

The scales on the edge of the upper lip are never more than 6, and a scale on the top of the head meets one of the lip scales between the eye and the nostril.

The front part of the upper jaw bone to which the two poison fangs are attached is fixed and not movable as in the other venomous snakes.

The fangs are tubular instead of being simply grooved.

It frequents sandy places and retires underground in the cold season, May to September.

It produces 10 to 15 young each year, which begin to snap right and left immediately. When disturbed it flattens out its body and

darts right and left very rapidly. It raises its head slightly when striking, but does not jump.

Mr. Johnston, P.M., has seen seven cases—three of whom died and four recovered.

THE BLACK SNAKE (*Pseudechis porphyriacus*).

Kreft, page 46, plate viii. and vi., fig 2.

Is very venomous, and the most common of all venomous snakes.

Length, 5 or 6 feet when full grown. It frequents swamps and marshy places, and is fond of water.

Colour, Black above; the outer series of scales red with black tip; muzzle, light brown.

When irritated it raises the front third of its body off the ground, flattens out its neck, and then darts at its enemy.

It brings forth 15 to 20 young in March, and goes underground in winter; has two grooved poison fangs curved backwards and attached to the front part of the upper jaw, which is hinged so as to allow the fangs to be laid up against the palate, or thrown suddenly forward when attacking an enemy.

The fangs are not long enough to pierce ordinary bush boots. Behind the poison fangs there are some smaller fangs not grooved.

As in all poisonous snakes a scale on the top of the head meets one of the lip scales between the Eye and the Nostril, and there are only six scales on the upper lip.

THE YELLOW BELLIED BLACK SNAKE. (*Pseudechis Australis*, *Naja Australis*); also called the ORANGE BELLIED BROWN SNAKE.

Kreft, page 47, plate vi., fig. ii. and iia.

Is common in the north, is a variety of the black snake and is often mistaken for it.

Length when full grown, 3ft. 6in.

Colour: Back and sides bright copper, with a rich orange spot in the centre of each scale on the outer row; *belly*, deep yellow or orange.

Poison fangs, similar to black snake. The head scale meets one of the lip scales between the eye and the nostril, and there are only six scales on the upper lip.

THE BROWN SNAKE. (*Diemenia superciliosa*).

Kreft, page 41, plate vii., and plate xii., fig. 10. is common in certain localities, inhabits rocky places, and is out during the day, and dangerous to man.

Length, 5 or 6 feet when full-grown, and is uniformly brown.

Colour: Dark-brown above, with a lighter band crossing behind the head, the side of face and chin lighter; the belly yellowish; the sides clouded with purple-grey, forming blotches, and sometimes black rings.

In winter the young hide under stones, and the full-grown retire underground. It has only six scales on the upper lip, and no scale between the one in which the nostril is and those in front of the eye.

Mr. Johnston, P.M., stated that he had seen twelve cases of bite from the brown snake and they all died.

THE TIGER OR BROWN BANDED SNAKE.

(*Hoplocephalus curtus*).

Kreft, page 53, plate ix. and plate xi., fig. 6.

Is the most dangerous of all Australian Snakes and is found in all parts of Australia; it is uncommon in Queensland, but common in Victoria.

The length varies with age, but full grown ones are 5 or 6 feet.

The colour varies from grey to almost black with bands more or less distinct.

The belly is straw yellow or bright orange.

(Tasmanian specimens differ, and there it is unfortunately sometimes called carpet snake, a name properly belonging to a harmless snake).

The black skin shows between the scales on the body when it is angry, or when the body is stretched out.

It is often confounded with the large scaled snake (*Hoplocephalus superbis*), but this is not seen in Queensland.

The middle scale of the head is almost square. The nostrilf opens through a scale and this scale meets one of those in front of the eye as well as one of the upper scales of the head, and one of those on the upper lip.

It has only six scales on the upper lip, like all venomous snakes.

The poison fangs are small, curved backwards and attached to the front part of the upper jaw; this part is movable and so the fangs can be thrown forward to bite; there are a series of smaller equal teeth behind.

It has thirty young every season varying much in colour.

It goes underground in winter and comes out in August or September according to the heat. It is very vicious and when attacked it raises the fore part of its body off the ground, and flattens its neck like the Indian Cobra, which it also resembles in the rapidly fatal nature of its poison. When bitten, dogs die in a little over two hours. Mr. Drummond lived nearly twenty-four hours; Underwood and Cartwright died within one hour; Dr. Casey reported a case of death within half-an hour; and Griffiths died within half-an-hour; a boy of nine lived eight hours; Dr. Thwaites has reported two cases of recovery due to treatment with strychnina.

THE KEELED OR NORTHERN BANDED SNAKE.

(*Pseudonaja nuchalis*).

Kreft, page 44, plate xii, fig. 13, is uncommon and easily mistaken for the ordinary water snake with the scales of the back keeled.

Length: Full-grown, 5 feet.

Colour: Brownish-olive with very broad dark cross bands, darkest on the neck; belly, yellow, with black spots in the young; eye, small; nostril between two scales; six scales on upper lip.

Poison fangs grooved and attached to front movable piece of upper jaw, a series of 5 or 6 teeth behind, which are not grooved; the front teeth of the lower jaw are the longest.

HOW TO DISTINGUISH POISONOUS FROM HARMLESS SNAKES.

1. Examine the upper teeth carefully. If there is a long backwardly curved tooth (one on each side), in front, this is the Venom Fang, and proves the snake to be a poisonous one.

2. Count the scales on the upper lip between the large scale in front, and the end of the gape; if there are not more than six the snake is a poisonous one. If there are seven or more the snake is harmless.

3. Examine the side of the face; look at the nostril and notice the *one scale through which* or the *two scales between which* it opens, these are called *Nasal*; then look at the eye and notice the scale or scales in front of it, these are called *Pre-ocular*; next look for a scale on the top of the head between the eye and the nostril, this is called

the *Frontal*; then look at the scales on the upper lip, these are called *Labial*. If these Nasal, Pre-ocular, Frontal, and Labial are kept apart by a distinct scale [which is called *Loreal*], then the snake is harmless; but if they meet together, and are *not kept apart* by a Loreal Scale, then the snake is poisonous.

4. Count a line of scales round the middle of the body, not including the broad plates on the belly; if there are more than 30 the snake is harmless. This test is useful where the head has been destroyed.

The Punctures.—Two distinct punctures only indicate that the snake is most probably a poisonous one; but if more than two punctures are visible, it does not follow that the bite is not dangerous, because a venomous snake may bite in such a manner as to make marks with other teeth as well as with the two poison fangs.

A harmless snake *generally* makes marks thus

. .
.
. .
. .
. .
. .

A venomous snake *generally* leaves only two, thus . . but

may make only one or more than two, so that this is a dangerous guide to rely on.

The danger varies according to the size and condition of the snake, the age and size and condition of the person bitten.

A small venomous snake which may kill a child will scarcely injure an adult.

A snake that has recently shed its skin or that has been irritated is more dangerous.

A snake that has recently bitten some other object is not so dangerous.

A person who has recently had food or drink does not absorb the poison so readily as one who has been fasting or is exhausted by much exercise.

MISCELLANEOUS INFORMATION.

THE COLOUR of Snakes varies much at different ages and periods and alters after death ; this explains the difficulty in accurately describing them, and accounts for much of the confusion that has arisen.

THE SKIN is shed at regular intervals, several times a year. It is removed in one piece, including the covering of the eyes. The snake retires to a damp place, the skin loses its gloss, and becomes opaque ; the snake then crawls through a forked branch or the cleft in a rock, and leaves its old skin behind turned inside out like a stocking. After this the snake is extra sensitive, and more inclined to bite.

THE TEETH are hook-like and curved backwards ; they are very sharp and designed to hold, not to crush or chew. The palate is furnished with teeth as well as the jaw. As a rule venomous snakes bite and then let go ; but the Pythons or Rock Snakes, which are not poisonous, hold on, and it is sometimes hard to disengage a finger from between the jaws. If dragged forcibly out the flesh is torn.

THE TIGER SNAKE one of the most dangerous, has been known to hold on to the part bitten, and great violence has had to be used to make it let go.

THE TONGUE of a snake is long and forked, and serves as a feeler. It is often mistaken for a sting, and thus many harmless snakes are thought to be dangerous.

THE TAIL of many snakes ends in a sharp point, and in the Death Adder is curved. This has given rise to an idea that some snakes can wound or sting with the tail. This is an error.

Some snakes have rudimentary or imperfectly-formed hind limbs. These snakes are always harmless.

No snake will offer to bite unless hurt or interfered with.

Venomous snakes are seldom seen from May to September, as the more dangerous ones always retire underground during the cold weather, only a few young ones being found under stones.

In the whole of Australia there are about twenty-one harmless, and forty-two venomous kinds, but of these forty-two not more than five or six species are dangerous to man, and these retire underground for nearly five months every year.

No *Australian* venomous snake that is not thicker than a man's little finger can endanger the life of a grown person although it may kill a child.

In warm climates many snakes make their winter quarters under flat stones through which the warmth of the sun can penetrate, and on warm days they often go a few yards from their hiding place.

Sea snakes are all venomous, but very shy.

The Whip snake is venomous but not dangerous to an adult.

Northern Queensland is rich in harmless Pythons and harmless freshwater snakes.

All poisonous snakes have two long teeth or fangs in the front part of the upper jaw with a canal which carries the poison from a gland at the side of the head to the tooth. When the snake opens its mouth the poison is pressed along the canal into the groove or pipe of the tooth and so into the wound.

The venom teeth or fangs are attached to the front part of the upper jawbone, called the pre-maxillary bone. This pre-maxillary bone is generally hinged so that the fangs can be folded up against

the palate and thrown forward when required for attack, but in some, as in the Death Adder, this bone is fixed and the fangs are always erect.

Kreft, plate 6, fig. 2, shows the poison fangs of the Australian Black Snake; plate 5, fig 1, shows the teeth of a harmless Diamond Snake.

The following snakes are harmless:—Blind Snakes, Fresh Water Snakes, Tree Snakes, Carpet Snakes, and Pythons or Rock Snakes; also all snakes that have—

1. Seven or more scales on the upper lip.
 2. A Loreal scale separating the Nasal and Pre-ocular or the Frontal and Labial scales.
 3. Thirty rows of scales round the middle of the body *not* counting the belly plates.
 4. Rudimentary hind limbs.
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